

Patient Assessment Scenario “I”

Comprehensive Guide



SCENARIO SETTING AND PATIENT INFORMATION

Setting

Emergency area of a community hospital that has surgical capabilities, portable x-ray, bedside ultrasound, and a blood bank with all blood components available. The nearest referral center is 45 miles (70 km) away. Ground and air transport are available.

Personnel

- The ATLS Learner is the only advanced care clinician available immediately
- Emergency Area Nurses (2)
- Emergency Area Technicians (4)
- General surgeon and anesthesiologist are available within 15 min

Incident History

Patient gender may be modified per site model.

M	35-year-old sustained a knife injury to the left chest in a reported domestic dispute 5 minutes prior to ambulance arrival.
I	A 2cm sucking stab wound is present in the left third intercostal space, just anterior to the midaxillary line. Left breath sounds are diminished. The skin is cool and diaphoretic. The patient responds to verbal and pressure stimulation by moaning and groaning.
S	Vital signs during transport are BP 80/40, HR 140, RR 32, and SpO ₂ 80%.
T	Petroleum gauze was placed over the chest wound. Oxygen is supplied via mask at 12 L/min. One large-caliber IV was inserted and 500cc of crystalloid solution was infused. Estimated time of arrival is 2 min.

INJURIES AND INJURY MANIFESTATIONS

PHYSICAL FINDINGS	INJURIES	SKILLS
Rapid and shallow respirations; stab wound in the left third intercostal space anterior to the midaxillary line; decreased left breath sounds; petroleum gauze placed pre-hospital	Open left pneumothorax	Airway assessment, Tube thoracostomy
Distended neck veins; muffled heart tones	Cardiac tamponade, likely cardiac injury	Evaluation penetrating injury and shock, Interpretation FAST/eFAST

Images and Results

- Slide 1: Chest x-ray – left pneumothorax
- Slide 2: Chest x-ray – left thoracostomy tube, lung expanded
- Slide 3: FAST (pericardial window video) – pericardial fluid is present
- Slide 4: FAST (pericardial window video) – pericardial fluid is present
- Slide 5: eFAST (still images) – left “barcode sign” indicative of pneumothorax, right normal “waves on a sandy beach” image

INITIAL ASSESSMENT

Pre-arrival Huddle

The Learner should mention they would assemble personnel to the Emergency Department based on the hospital’s trauma activation system, then assign roles and responsibilities. The Learner should indicate that appropriate personal protective equipment must be worn. The Learner should conduct the pre-arrival huddle and oversee the systematic handover at the time of patient arrival.

Primary Survey x-ABCDE



The Learner should identify injuries and subsequent physical and imaging findings in proper sequence and institute resuscitative measures.

The Learner should indicate that all clothing should be removed, and hypothermia prevention occurs such as by providing warm blankets, increasing the room temperature, and providing warmed IV fluids.

X: eXsanguinating eXternal Hemorrhage

- A non-bleeding 2 cm stab wound is present in the left third intercostal space anterior to the midaxillary line. There are no other stab wounds. Massive external blood loss is not present.

A: Airway

- The Learner should evaluate the airway. The voice is weak but clear. Respirations are not noisy. The upper airway is not obstructed. However, respirations are rapid due to shock and shallow due to a pneumothorax.
- The Learner may evaluate the airway with a jaw thrust. No material is aspirated with suction.
- The Learner should assess the rest of the neck. The trachea is midline and the neck veins are distended.
- The airway is open and the patient is able to spontaneously maintain an unobstructed airway. The above maneuvers do not alleviate the respiratory distress. Advanced airway maneuvers are not indicated. The Learner should progress to Breathing assessment.

B: Breathing

- The Learner must identify decreased left breath sounds and respiratory distress. A pulse oximeter should be placed if not done already. SpO₂ is 80%. If the Learner percusses the chest, the left chest is tympanic.
- The Learner should recognize the presence of life-threatening hypoxemia and the possibility of a left tension pneumothorax based on the exam and proceed with left finger thoracostomy followed by tube insertion. If the Learner performs a needle thoracostomy, the catheter malfunctions immediately and symptoms recur. If a chest x-ray is requested, it may be obtained.



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However, the image is not immediately available. The Instructor may share the image (Slide #1) later in the Primary Survey.

- If eFAST is requested, the Instructor may show the lung images from Slide #5. Left lung slide is absent.



- The Learner should describe the correct anatomic landmarks and steps of performing finger thoracostomy followed by tube thoracostomy. There is a small rush of air and small amount of blood. SpO₂ improves to 92%. There is no decrease in respiratory rate and no increase in blood pressure.
- The Learner should indicate that the thoracostomy tube is connected to an underwater seal apparatus. Thoracostomy tube output is 100 mL of blood.
- After thoracostomy tube placement, the Learner should reevaluate Breathing. The breath sounds are improved on the left. The left chest wound is not bleeding and is adequately sealed with petroleum gauze.
- A chest x-ray should be ordered. However, evaluation should not be delayed and the image will not be available until during Circulation assessment. The Learner should progress to Circulation assessment.

C: Circulation

- The Learner should request new vital signs, which are BP 70/40, HR 130, RR 42, and SpO₂ 92%.
- The airway is without obstruction. The patient is anxious and states, “I think I am about to die.” The Learner should assess the skin (cold, capillary refill >4 sec, central cyanosis). Neck veins are distended. The Learner should assess for the etiology of shock.



- The Learner should recognize the potential for cardiac tamponade. The surgeon should be contacted immediately.
- The Learner should confirm the presence of pericardial effusion using ultrasound. The included ultrasound videos (Slides #3 and #4) may be shown to the Learner to interpret. Pericardial fluid is present. If not previously done, the surgeon must be contacted now. The patient requires emergent surgical consultation and surgical intervention in the operating room.
- Ultrasound-guided pericardiocentesis is only a short-term temporizing maneuver. In this scenario there is a surgeon and operating room available, so pericardiocentesis would not be performed.
- If not done already, the Learner should confirm a second large-caliber IV and obtain labs including a type and crossmatch.
- If the Learner discusses uncontrolled hemorrhage, evaluation is:
 - **External (the floor)** – There is no external bleeding.
 - **Thoracic cavity** – Chest x-ray images are available. The Instructor may show the images on Slides #1 (before tube thoracostomy) and Slide #2 (after thoracostomy). There is not a thoracic source of hemorrhage.
 - **Peritoneal cavity** – The Learner should request FAST, eFAST. If FAST/eFAST, no intra-abdominal or pelvic fluid is present. The included FAST videos (Slides #3 and #4) may be shown to the Learner to interpret. Pericardial fluid is present. Lung images demonstrate return of left lung sliding. If DPL is requested, the equipment is not available.
 - **Retroperitoneal Space** – The Learner should conclude that the mechanism of injury is not consistent with pelvic fracture.

- **Long Bone / Soft Tissue Compartments** – The Learner should examine the extremities for other wounds and muscle compartment swelling. There are no other wounds.

- If the Learner elects to intubate the patient without assessing for cardiac tamponade and administering volume resuscitation, cardiac arrest occurs after administration of RSI medications. After cardiac arrest occurs, the Learner may describe performing a resuscitative left thoracotomy and releasing the cardiac tamponade. Despite these efforts the patient expires.



- The Learner should initiate volume resuscitation. The patient has received 500cc of crystalloid. The Learner can administer an additional small volume of crystalloid or blood product.

D: Disability

- Pupils are equal, round, and react briskly to light.
- The eyes open spontaneously. E = 4.
- The patient follows instructions and moves all extremities equally. M = 6.
- The patient speaks clearly and is anxious and confused. V = 4.
- GCS score = 14 (E4, V4, M6).

E: Environment/Exposure

- If not already performed, the Learner should remove all clothing for complete examination.
- The back is examined by this point.
- Hypothermia prevention measures are instituted.

ADJUNCTS TO THE PRIMARY SURVEY

Monitoring Devices

ECG rhythm, blood pressure, and SpO₂ monitoring should be performed.

Chest and Pelvic X-rays, FAST and eFAST Exams

No further imaging is indicated. A 12 lead ECG may be performed.

Urinary Bladder Catheter

The Learner should evaluate the perineum. There is no injury or blood present at the urethral meatus and no ecchymosis of the perineum. A urinary catheter may be inserted.

Gastric Decompression

Placement of gastric tube is not indicated.

Arterial Blood Gases

Arterial blood gas, if obtained, is pH 7.12, PaO₂ 80 mmHg (10.7 kPa), PaCO₂ 28 mmHg (3.7 kPa), SaO₂ 93%, and base deficit 18.4 mEq/L.

Blood Tests

Blood should be sent for type and crossmatch and laboratory studies.

Case Status after Primary Survey and Adjuncts

The Learner should reevaluate xABCDE before proceeding to the secondary survey. The Learner should perform a tactical pause reassessment to promote shared mental models and team situational awareness.



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The Learner should indicate that emergent surgical consultation and operative intervention is required for the diagnosis of pericardial effusion and cardiac tamponade. The Learner should confirm appropriate placement of the left thoracostomy tube by chest x-ray (Slide #2).

Ideally the patient will be transported to the operating room as soon as possible. This should occur as soon as the surgeon and operative space is available. If this happens, the Learner should recognize that the secondary survey will be completed after the operation. In this scenario, the operating room and staff will be ready within 10-15 minutes of the initial call to the surgeon, allowing the Learner time to complete the secondary survey.

SECONDARY SURVEY

Head

No external trauma is identified. The patient maintains the same level of consciousness and neurological status. There are no motor or sensory deficits.

Neck

The neck veins remain distended. No other deformity, crepitus, or swelling is present.

Chest

The 2 cm stab wound in the left third intercostal space anterior to the midaxillary line is not bleeding or bubbling. The petroleum gauze dressing is intact. The left thoracostomy tube is in appropriate position without air leak. The output from the thoracostomy tube is now at 300 mL of blood.

Abdomen

The Learner should acknowledge the possibility of the knife trajectory causing injury to the abdomen. The abdomen is inspected and palpated. There is no injury to the abdomen. The abdomen is soft and no tenderness is present upon palpation. If performed, no intraabdominal fluid is detected by FAST/eFAST.

Pelvis/Perineum

No tenderness on palpation of the pelvis. No abnormalities are present.

Musculoskeletal System

No abnormal findings are present. The Learner should ensure no other wounds are present on the extremities and back. The Learner may consider tetanus immunization and antibiotic administration.

Imaging and Other Diagnostic Studies

No further imaging is indicated following secondary survey.

TRANSFER TO DEFINITIVE CARE

The Learner should perform a tactical pause reassessment to promote shared mental models and team situational awareness after the secondary survey. The Learner should indicate that the patient requires transfer to the operating room to treat pericardial effusion and cardiac tamponade. The Learner must speak to the operating surgeon. The surgeon and operating room are available now and the patient will be transported expeditiously to the operating room.

Pretransfer Management

The Learner should describe these aspects of management during transfer:

- ECG rhythm, pulse oximetry, and blood pressure monitoring
- Administration of supplemental oxygen with continued reassessment of pulmonary status
- Adequate fixation of thoracostomy tube
- Monitoring of thoracostomy tube function and thoracostomy tube output
- Assessment of effectiveness of resuscitation
- Appropriate consultation with the operating surgeon
- Discuss all significant laboratory and imaging data

Transfer Specifics

The Learner should indicate the specifics of the transfer including the personnel and equipment / supplies. If time permits, question the Learner about plans for managing changes in patient status that may occur during the transport process, such as thoracostomy tube dislodgement / increased output, dislodgement of petroleum gauze dressing, cardiac dysrhythmia, worsening hypotension, worsening hypoxia, and unconsciousness.

The Learner should use a systemic method of communication, such as the S-xABCDE-BAR method, to discuss the patient with the receiving operative surgeon. Specific data to relate are:

- Left anterior chest stab wound
- Prehospital treatment with petroleum gauze
- Left pneumothorax managed by thoracostomy tube
- Thoracostomy tube output is now 300 mL
- Cardiac tamponade physiology
- Pericardial effusion by FAST/eFAST with potential cardiac injury.
- Administration of crystalloid and blood products.
- No intraabdominal fluid on FAST/eFAST, however there is potential for abdominal injury based on mechanism of injury.
- Any medical history obtained from patient
- Discussion of potential domestic abuse and protection

Team Debrief

After transfer to the operating room is completed, the Learner should lead an event debrief for the team. The TAKE STOCK tool may be used.

- Take an instruction sheet
- Ask “Is everyone OK?”
- Know if anyone needs a break
- Equipment issues?
- Summarize the event
- Things that went well?
- Opportunities to learn?
- Cold debrief needed?
- Know who is present



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DIRECTIONS FOR MOULAGE

- Apply makeup to simulate shock and cyanosis.
- Simulate diaphoresis
- Apply makeup to simulate distended neck veins.
- Apply makeup and moulage to simulate a left open chest wound 2 cm in length. Add a few trickles of blood down the chest wall.
- Place an oxygen mask on the patient's face.

DIRECTIONS FOR THE PATIENT MODEL

You were stabbed in the left chest by your partner with a butcher knife. You are restless and lethargic but respond appropriately to questions and commands. You are in moderate respiratory distress. You become more anxious during the encounter, saying things like, “I think I am about to die.” When the Learner listens to your left chest, exchange a small amount of air or hold your breath. After the left thoracostomy tube is inserted, you can breath more normally.

Notes:

